

DIERICHS et al. — 10/784,895  
Attorney Docket: 081468-0305313

IN THE SPECIFICATION:

Please amend the specification as follows:

Page 1, delete the paragraph [0001] and replace it with the following new paragraph:

[0001] This application is a continuation-in-part of co-pending U.S. Application 10/388,766, filed March 17, 2003 and now U.S. Patent 6,771,352, entitled "LITHOGRAPHIC APPARATUS AND DEVICE MANUFACTURING METHOD," which claims priority from European Application No. 02251933.4, filed March 18, 2002, the entire contents of which are herein incorporated by reference. This application also incorporates by reference U.S. Applications 10/379,999, filed March 6, 2003 and now U.S. Patent 6,927,004, entitled "MASK FOR USE IN LITHOGRAPHY, METHOD OF MAKING A MASK, LITHOGRAPHIC APPARATUS, AND DEVICE MANUFACTURING METHOD," and 10/157,033, filed May 30, 2002 and now U.S. Patent 6,737,662, entitled "LITHOGRAPHIC APPARATUS, DEVICE MANUFACTURING METHOD, DEVICE MANUFACTURED THEREBY, CONTROL SYSTEM, COMPUTER PROGRAM, AND COMPUTER PRODUCT." This application incorporates by reference U.S. Patent 6,583,855, issued June 24, 2003 and entitled "LITHOGRAPHIC APPARATUS, DEVICE MANUFACTURING METHOD, AND DEVICE MANUFACTURED THEREBY."

Page 4, delete the paragraph [0009] and replace it with the following new paragraph:

[0009] For the sake of simplicity, the projection system may hereinafter be referred to as the "lens." However, this term should be broadly interpreted as encompassing various types of projection system, including refractive optics, reflective optics, and catadioptric systems, for example. The radiation system may also include components operating according to any of these design types for directing, shaping or controlling the ~~projection~~ beam of radiation, and such components may also be referred to below, collectively or singularly, as a "lens". Further, the lithographic apparatus may be of a type having two or more substrate tables (and/or two or more mask tables). In such "multiple stage" devices the additional tables may be used in parallel or preparatory steps may be carried out on one or more tables while one or more other tables are being used for exposures. Dual stage lithographic apparatus are described, for example, in U.S. Patents 5,969,441 and 6,262,796.

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Page 5, delete the paragraph [0012] and replace it with the following new paragraph:

[0012] The illumination system may also include elements configured to correct non-uniformities in the illumination beam at or near image planes. For example, the illumination system may include diffractive optical elements to improve the match of the projection beam cross-section proximal the entrance face of the integrator rod with the shape of the entrance face. A diffractive optical element typically includes an array of microlenses, which may be Fresnel lenses or Fresnel zone plates. Improving the match alleviates the problem of field dependent lithographic errors occurring in the patterned layer. The matching may hereinafter be referred to as "filling" of the integrator entrance face. A diffractive optical element may also be positioned, for example, in front of a beam shaping element, such as a zoom-axicon, to transform the angular distribution of radiation provided by an excimer laser beam into a predetermined angular distribution of radiation to generate a desired illumination mode. Illumination systems as discussed above are disclosed, for example, in U.S. Patents 5,675,401 and 6,285,443.

Page 5, delete the paragraph [0013] and replace it with the following new paragraph:

[0013] The illumination system may also include, for example, a filter partially transmissive to radiation of the projection beam with a predetermined spatial distribution of transmittance, immediately before the plane of the pattern, to reduce spatial intensity variations.

Page 8, delete the paragraph [0021] and replace it with the following new paragraph:

[0021] According to another aspect of the present invention a device manufacturing method includes ~~providing a substrate at least partially covered by a layer of radiation-sensitive material;~~ providing a beam of radiation using a radiation system, the radiation system including an illumination system; using a patterning device to endow the beam of radiation with a pattern in its cross-section; projecting the patterned beam of radiation onto a target portion of ~~[[the]]~~ a layer of radiation-sensitive material at least partially covering a substrate using a projection system; and selectively inserting at least one blade of a plurality of blades into the beam of radiation in a first plane intermediate a second plane conjugate to a plane of the substrate and a third plane conjugate to a pupil plane of the projection system.

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Page 8, delete the paragraph [0023] and replace it with the following new paragraph:

[0023] According to an even further aspect of the present invention, a device manufacturing method includes ~~providing a substrate at least partially covered by a layer of radiation-sensitive material;~~ providing a beam of radiation using a radiation system, the radiation system including an illumination system, the illumination system including a field faceted mirror and a pupil faceted mirror; using a patterning device to endow the beam of radiation with a pattern in its cross-section; projecting the patterned beam of radiation onto a target portion of ~~[[the]]~~ a layer of radiation-sensitive material at least partially covering a substrate using a projection system; and selectively inserting at least one reflective blade into the beam of radiation in front of at least one facet of at least one of the field faceted mirror and the pupil faceted mirror to reflect a portion of the beam of radiation to a beam dump.

Page 10, delete the paragraph [0045] and replace it with the following new paragraph:

#### DETAILED DESCRIPTION

[0045] Figure 1 schematically depicts a lithographic projection apparatus 1 according to an embodiment of the invention. The apparatus 1 includes a base plate BP. A illumination system is configured to supply a ~~projection~~ beam PB of radiation (e.g. EUV radiation). A radiation source SO is configured to provide ~~[[a]]~~ radiation ~~[[beam]]~~ to the illumination system IL. The source SO and the apparatus 1 may be separate, for example when the source is a plasma discharge source. In such case, the source SO is not considered to form part of the apparatus 1 and the radiation beam is generally passed from the source LA to the illumination system IL with the aid of a radiation collector including, for example, suitable collecting mirrors and/or a spectral purity filter. In other cases, the source SO may be integral with the apparatus 1, for example when the source SO is a mercury lamp. The present invention encompasses both of these scenarios. The source SO and the illumination system IL may be referred to as a radiation system.

Page 11, delete the paragraph [0048] and replace it with the following new paragraph:

[0048] The source SO (e.g. a discharge or laser-produced plasma source) produces ~~[[a]]~~ radiation ~~[[beam]]~~. The radiation ~~[[beam]]~~ is fed into the illumination system IL, either directly or after having traversed a conditioning device, such as a beam expander Ex, for

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example. The illumination system IL may include an adjusting device AM that sets the outer and/or inner radial extent (commonly referred to as  $\sigma$ -outer and  $\sigma$ -inner, respectively) of the angular intensity distribution in the radiation beam. In addition, it will generally include various other components, such as an integrator IN and a condenser CO. In this way, the projection beam PB impinging on the mask MA has a desired uniformity and intensity distribution in its cross-section.

Page 11, delete the paragraph [0049] and replace it with the following new paragraph:

[0049] The projection beam PB subsequently intercepts the mask MA, which is held on a mask table MT. Having traversed the mask MA, the projection beam PB passes through the lens PL, which focuses the projection beam PB onto a target portion C of the substrate W. With the aid of the second positioning device PW and interferometer IF, the substrate table WT can be moved accurately, e.g. so as to position different target portions C in the path of the beam PB. Similarly, the first positioning device PM can be used to accurately position the mask MA with respect to the path of the beam PB, e.g. after mechanical retrieval of the mask MA from a mask library, or during a scan. In general, movement of the object tables MT, WT will be realized with the aid of a long-stroke module (coarse positioning) and a short-stroke module (fine positioning), which are not explicitly depicted in Figure 1. However, in the case of a wafer stepper (as opposed to a step and scan apparatus) the mask table MT may just be connected to a short stroke actuator, or may be fixed. The mask MA and the substrate W may be aligned using mask alignment marks  $M_1$ ,  $M_2$  and substrate alignment marks  $P_1$ ,  $P_2$ .

Page 12, delete the paragraph [0052] and replace it with the following new paragraph:

[0052] 2. In scan mode, essentially the same scenario applies, except that a given target portion C is not exposed in a single "flash." Instead, the mask table MT is movable in a given direction (the so-called "scan direction", e.g., the Y direction) with a speed  $v$ , so that the projection beam PB is caused to scan over a mask image. Concurrently, the substrate table WT is simultaneously moved in the same or opposite direction at a speed  $V = Mv$ , in which  $M$  is the magnification of the lens PL (typically,  $M = 1/4$  or  $1/5$ ). In this manner, a relatively large target portion C can be exposed, without having to compromise on resolution.

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Page 17, delete the paragraph [0072] and replace it with the following new paragraph:

[0072] Referring to Figures 12a and 12b, the illumination system includes blade mirrors BM selectively insertable or positionable in front of facets of the field faceted mirror 13. The blade mirrors BM are coated to be reflective. The coating may include a surface roughness so that the reflected radiation is scattered. Such a coating is disclosed in U.S. ~~Application 10/379,999~~ Patent 6,927,004, incorporated herein by reference. The coating may also include a phase changing structure so that the reflected radiation from individual blade mirrors cancel each other. Such a coating including a phase changing structure is disclosed in U.S. ~~Application 10/379,999~~ Patent 6,927,004.